## CLAIMS

1. A method for allocating media unit sequences among a plurality of output channels, the method comprising the steps of:

generating previous media unit sequence behavior pattern information;

estimating at least one aspect of a predicted overflow in at least two output channels, in response to (a) at least a portion of the previous media unit sequence behavior pattern information, and (b) at least two potential allocations of media unit sequences; and

selecting a selected allocation out of the at least two potential allocations in response to the at least one aspect of the predicted overflow.

2. The method of claim 1 wherein the step of selecting comprising selecting a selected allocation that that optimizes the at least one aspect of the predicted overflow.

3. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects a size of at least one media unit sequence during at least one previous time period.

4. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects changes in the size of at least one media unit sequence during at least one previous time period.

5. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects an average size of at least one media unit sequence during at least one previous time period.

6. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects a maximal size of at least one media unit sequence during at least one previous time period.

7. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects both a temporal size of at least one media

unit sequence during at least one previous time period and a duration of time during which the at least one media unit was characterized by the temporal size.

8. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects a relevant maximum of at least one media unit sequence during at least one previous time period.

9. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects a size variance of at least one media unit sequence during at least one previous time period.

10. The method of claim 1 wherein the previous media unit sequence behavior pattern information reflects quality patterns of the media unit sequence during at least one previous time period.

11. The method of claim 1 wherein the step of estimating comprising a step of comparing an output channel estimated capacity and an aggregate estimated output channel required capacity, for each output channel out of the at least two output channels.

12. The method of claim 1 wherein an aspect of a predicted overflow is a peak value of the predicted overflow.

13. The method of claim 1 wherein an aspect of a predicted overflow is a flatness of the predicted overflow.

14. The method of claim 1 wherein an aspect of a predicted overflow is a mean value of the predicted overflow.

15. The method of claim 1 wherein an aspect of a predicted overflow is a variance of the predicted overflow.

16. The method of claim 1 wherein an aspect of a predicted overflow is at least one moment of the predicted overflow.

17. The method of claim 1 wherein an aspect of a predicted overflow is at least one moment of the mean value of the predicted overflow.

18. The method of claim 1 wherein an aspect of the predicted overflow in an l'th output channel is reflected by $\overrightarrow{NOF_l}$.

19. The method of claim 17 wherein $\overrightarrow{NOF_l} = \frac{\left(\vec{T_l} - C_l\right)_+}{C_l}$.

20. The method of claim 17 wherein $\overrightarrow{NOF_l} = \frac{\left(\vec{T_l} - C_l\right)_+}{\vec{T_l}}$.

21. The method of claim 17 wherein $\overrightarrow{NOF_l} = \frac{\left(\vec{T_l} - C_l\right)_+}{C_l - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\vec{T_l}$.

22. The method of claim 17 wherein $\overrightarrow{NOF_l} = \frac{\left(\vec{T_l} - C_l\right)_+}{\vec{T_l} - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\vec{T_l}$.

23. The method of claim 17 wherein $\overrightarrow{NOF_l} = \frac{\left(\vec{T_l} - C_l\right)_+}{1}$.

24. The method of claim 1 wherein an aspect of the predicted overflow in an l'th output channel is reflected by $\overrightarrow{NOF_l} \bullet \vec{W}$, whereas $\vec{W}$ including weight factors, each weight factor representative of a previous time period.

25. The method of claim 1 wherein an aspect of the predicted overflow in an l'th output channel reflects $\overrightarrow{NOF_l}$ and $\vec{P}$ whereas $\vec{P}$ is representative of a combination of priorities of media unit sequences allocated to an l'th output channel.

26. The method of claim 1 wherein the step of estimating comprising the step of calculating a target function, for each potential allocation.

27. The method of claim 25 wherein the target function is $\max_{1 \le l \le k} \left\| \overrightarrow{NOF_l} \right\|_s$, whereas s≥1.

28. The method of claim 25 wherein the target function is $\max_{1 \le l \le k} \left\| \overrightarrow{NOF_l} \right\|_s$, whereas s=∞.

29. The method of claim 25 wherein the target function is $\sum_{l=1}^{k} \left\| \overrightarrow{NOF_l} \right\|_s$, whereas s≥1.

30. The method of claim 25 wherein the target function is $\sum_{l=1}^{k} \left\| \overrightarrow{NOF_l} \right\|_s$, whereas s=∞.

31. The method of claim 25 wherein the target function is $\max_{1 \le l \le k} \left\| \overrightarrow{NOF_l} \right\|_{s,w}$ whereas s≥1 and w>0.

32. The method of claim 25 wherein the target function is $\max_{1 \le l \le k} \left\| \overrightarrow{NOF_l} \right\|_{s,w}$ whereas s=∞ and w>0.

33. The method of claim 25 wherein the target function is $\sum_{l=1}^{k} \left\| \overrightarrow{NOF_l} \right\|_{s,w}$ whereas s≥1 and w>0.

34. The method of claim 25 wherein the target function is $\sum_{l=1}^{k} \left\| \overrightarrow{NOF_l} \right\|_{s,w}$ whereas s=∞ and w>0.

35. The method of claim 1 further comprising a step of allocating the media unit sequences in response to the selected allocation.

36. The method of claim 34 further comprising a step of multiplexing media unit sequences being allocated to the same output channel to provide an output channel multiplexed sequence.

37. The method of claim 35 further comprising a step of compressing at least one media unit sequence allocated to an output channel if the aggregate size of media unit sequences allocated to the output channel exceeds the output channel capacity.

38. The method of claim 36 wherein the step of compressing comprising a step of selecting at least one media unit sequence to be compressed in response to compression priority associated with each media unit sequence.

39. The method of claim 37 wherein the step of compressing comprising a step of selecting at least one media unit sequence to be compressed in response to previous media unit sequence behavior pattern information.

40. The method of claim 1 wherein the potential allocation of media unit sequences respond to at least one allocation constraint.

41. The method of claim 39 wherein the allocation constraint reflect a relationship between a media unit sequence and at least one output channel.

42. The method of claim 39 wherein the allocation constraint reflect a relationship between at least two media unit sequence.

43. The method of claim 1 wherein the at least one previous time period are selected from a group of a plurality of consecutive time periods.

44. The method of claim 1 wherein the length of a previous time period ranges between a second to a minute.

45. The method of claim 1 wherein the length of a previous time period ranges between a minute to an hour.

46. The method of claim 1 wherein the length of a previous time period ranges between an hour and a day.

47. The method of claim 1 wherein a media unit sequence is a program.

48. The method of claim 1 wherein the media unit sequences are MPEG compliant.

49. The method of claim 1 wherein the step of estimating comprising the steps of:

estimating, for each time period out of a plurality of previous time periods, at least one aspect of a predicted overflow in at least two output channels in response to the previous media unit sequence behavior pattern information during the previous time period and in response to at least two potential allocations of media unit sequences;

selecting a selected allocation out of the at least two potential allocations that optimizes the at least one aspect of the predicted overflow.

50. The method of claim 48 wherein the previous media unit sequence behavior pattern information during the previous time period is utilized to estimate a predicted overflow during a current time period.

51. The method of claim 48 wherein the previous media unit sequence behavior pattern information during the previous time period is utilized to estimate a predicted overflow during a future time period.

52. The method of claim 49 wherein the previous time period is spaced by at least one cycle period from the current time period.

53. The method of claim 23 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{C_l}$.

54. The method of claim 23 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{\overrightarrow{T_l}}$.

55. The method of claim 23 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{C_l - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\overrightarrow{T_l}$.

56. The method of claim 23 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{\overrightarrow{T_l} - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\overrightarrow{T_l}$.

57. The method of claim 23 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{1}$.

58. The method of claim 24 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{C_l}$.

59. The method of claim 24 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{\overrightarrow{T_l}}$.

60. The method of claim 24 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{C_l - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\overrightarrow{T_l}$.

61. The method of claim 24 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{\overrightarrow{T_l} - A_l}$, whereas $A_l$ represents a constant non-compressible component of $\overrightarrow{T_l}$.

62. The method of claim 24 wherein $\overrightarrow{NOF_l} = \frac{\left(\overrightarrow{T_l} - C_l\right)_+}{1}$.

63. The method of claim 39 wherein the allocation constraint reflects output channel limitations.

64. The method of claim 61 wherein the output channel limitations comprise a maximal amount of media unit sequences that can be simultaneously transmitted over the output channel.